

General

Guideline Title

2014 evidence-based guideline for the management of high blood pressure in adults. Report from the panel members appointed to the Eighth Joint National Committee (JNC 8).

Bibliographic Source(s)

James PA, Oparil S, Carter BL, Cushman WC, Dennison-Himmelfarb C, Handler J, Lackland DT, LeFevre ML, MacKenzie TD, Ogedegbe O, Smith SC Jr, Svetkey LP, Taler SJ, Townsend RR, Wright JT Jr, Narva AS, Ortiz E. 2014 evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the Eighth Joint National Committee (JNC 8). JAMA. 2014 Feb 5;311(5):507-20. [45 references] [PubMed](#)

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, Jones DW, Materson BJ, Oparil S, Wright JT Jr, Roccella EJ. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: The JNC 7 Report. JAMA. 2003 May 21;289(19):2560-71. [81 references]

Recommendations

Major Recommendations

The levels of evidence (High, Moderate and Low), and the strength of recommendation (Grade A-E, N) are defined at the end of the "Major Recommendations" field.

Recommendation 1

In the general population aged 60 years or older, initiate pharmacologic treatment to lower blood pressure (BP) at systolic blood pressure (SBP) of 150 mm Hg or higher or diastolic blood pressure (DBP) of 90 mm Hg or higher and treat to a goal SBP lower than 150 mm Hg and goal DBP lower than 90 mm Hg.

Strong Recommendation – Grade A

Corollary Recommendation

In the general population aged 60 years or older, if pharmacologic treatment for high BP results in lower achieved SBP (for example, <140 mm Hg) and treatment is not associated with adverse effects on health or quality of life, treatment does not need to be adjusted.

Expert Opinion – Grade E

Recommendation 2

In the general population younger than 60 years, initiate pharmacologic treatment to lower BP at DBP of 90 mm Hg or higher and treat to a goal DBP of lower than 90 mm Hg.

For ages 30 through 59 years, Strong Recommendation – Grade A

For ages 18 through 29 years, Expert Opinion – Grade E

Recommendation 3

In the general population younger than 60 years, initiate pharmacologic treatment to lower BP at SBP of 140 mm Hg or higher and treat to a goal SBP of lower than 140 mm Hg.

Expert Opinion – Grade E

Recommendation 4

In the population aged 18 years or older with chronic kidney disease (CKD), initiate pharmacologic treatment to lower BP at SBP of 140 mm Hg or higher or DBP of 90 mm Hg or higher and treat to goal SBP of lower than 140 mm Hg and goal DBP lower than 90 mm Hg.

Expert Opinion – Grade E

Recommendation 5

In the population aged 18 years or older with diabetes, initiate pharmacologic treatment to lower BP at SBP of 140 mm Hg or higher or DBP of 90 mm Hg or higher and treat to a goal SBP of lower than 140 mm Hg and goal DBP lower than 90 mm Hg.

Expert Opinion – Grade E

Recommendation 6

In the general nonblack population, including those with diabetes, initial antihypertensive treatment should include a thiazide-type diuretic, calcium channel blocker (CCB), angiotensin-converting enzyme inhibitor (ACEI), or angiotensin receptor blocker (ARB).

Moderate Recommendation – Grade B

Recommendation 7

In the general black population, including those with diabetes, initial antihypertensive treatment should include a thiazide-type diuretic or CCB.

For general black population: Moderate Recommendation – Grade B

For black patients with diabetes: Weak Recommendation – Grade C

Recommendation 8

In the population aged 18 years or older with CKD and hypertension, initial (or add-on) antihypertensive treatment should include an ACEI or ARB to improve kidney outcomes. This applies to all CKD patients with hypertension regardless of race or diabetes status.

Moderate Recommendation – Grade B

Recommendation 9

The main objective of hypertension treatment is to attain and maintain goal BP. If goal BP is not reached within a month of treatment, increase the dose of the initial drug or add a second drug from one of the classes in recommendation 6 (thiazide-type diuretic, CCB, ACEI, or ARB). The clinician should continue to assess BP and adjust the treatment regimen until goal BP is reached. If goal BP cannot be reached with 2 drugs, add and titrate a third drug from the list provided. Do not use an ACEI and an ARB together in the same patient. If goal BP cannot be reached using the drugs in recommendation 6 because of a contraindication or the need to use more than 3 drugs to reach goal BP, antihypertensive drugs from other classes can be used. Referral to a hypertension specialist may be indicated for patients in whom goal BP cannot be attained using the above strategy or for the management of complicated patients for whom additional clinical consultation is needed.

Expert Opinion – Grade E

Definitions:

Evidence Quality Rating

Type of Evidence	Quality Rating*
Well-designed, well-executed randomized controlled trials (RCTs) that adequately represent populations to which the results are applied and directly assess effects on health outcomes Well-conducted meta-analyses of such studies Highly certain about the estimate of effect; further research is unlikely to change confidence in the estimate of effect	High
RCTs with minor limitations affecting confidence in, or applicability of, the results Well-designed, well-executed non-randomized controlled studies and well-designed, well-executed observational studies Well-conducted meta-analyses of such studies Moderately certain about the estimate of effect; further research may have an impact on confidence in the estimate of effect and may change the estimate	Moderate
RCTs with major limitations Non-randomized controlled studies and observational studies with major limitations affecting confidence in, or applicability of, the results Uncontrolled clinical observations without an appropriate comparison group (e.g., case series, case reports) Physiological studies in humans Meta-analyses of such studies Low certainty about the estimate of effect; further research is likely to have an impact on our confidence in the estimate of effect and is likely to change the estimate.	Low

*The evidence quality ratings system used in the guideline was developed by the National Heart, Lung, and Blood Institute's (NHLBI's) Evidence-Based Methodology Lead (with input from NHLBI staff, external methodology team, and guideline panels and work groups) for use by all the NHLBI cardiovascular disease (CVD) guideline panels and work groups during this project. Additional details regarding the strength of recommendation grading system are available in the online Supplement (see the "Availability of Companion Documents" field).

Strength of Recommendations

Grade	Strength of Recommendation
A	Strong Recommendation There is high certainty based on evidence that the net benefit ^a is substantial.
B	Moderate Recommendation There is moderate certainty based on evidence that the net benefit is moderate to substantial or there is high certainty that the net benefit is moderate.
C	Weak Recommendation There is at least moderate certainty based on evidence that there is a small net benefit.
D	Recommendation Against There is at least moderate certainty based on evidence that it has no net benefit or that risks/harms outweigh benefits.
E	Expert Opinion ("There is insufficient evidence or evidence is unclear or conflicting, but this is what the committee recommends.") Net benefit is unclear. Balance of benefits and harms cannot be determined because of no evidence, insufficient evidence, unclear evidence, or conflicting evidence, but the committee thought it was important to provide clinical guidance and make a recommendation. Further research is recommended in this area.
N	No Recommendation for or against ("There is insufficient evidence or evidence is unclear or conflicting.") Net benefit is unclear. Balance of benefits and harms cannot be determined because of no evidence, insufficient evidence, unclear evidence, or conflicting evidence, and the committee thought no recommendation should be made. Further research is recommended in this area.

^aNet benefit is defined as benefits minus the risks/harms of the service/intervention.

Note: The strength of recommendation grading system used in the guideline was developed by the National Heart, Lung, and Blood Institute's (NHLBI's) Evidence-Based Methodology Lead (with input from NHLBI staff, external methodology team, and guideline panels and work groups) for use by all the NHLBI cardiovascular disease (CVD) guideline panels and work groups during this project. Additional details regarding the strength of recommendation grading system are available in the online Supplement (see the "Availability of Companion Documents" field).

Clinical Algorithm(s)

An algorithm titled "2014 Hypertension Guideline Management Algorithm" is provided in the original guideline document.

Scope

Disease/Condition(s)

Hypertension

Guideline Category

Evaluation

Management

Prevention

Screening

Treatment

Clinical Specialty

Cardiology

Endocrinology

Family Practice

Geriatrics

Internal Medicine

Nephrology

Nursing

Preventive Medicine

Intended Users

Advanced Practice Nurses

Health Care Providers

Health Plans

Managed Care Organizations

Nurses

Pharmacists

Physician Assistants

Physicians

Public Health Departments

Guideline Objective(s)

To address thresholds and goals for pharmacologic treatment of hypertension and whether particular antihypertensive drugs or drug classes improve important health outcomes compared with other drug classes

Target Population

Adults age 18 and older with hypertension

Interventions and Practices Considered

Antihypertensive treatment based on ethnic group and current blood pressure (BP) levels:

- Thiazide-type diuretics
- Calcium channel blockers (CCBs)
- Angiotensin-converting enzyme inhibitor (ACEI)
- Angiotensin receptor blocker (ARB)
- Beta blockers and other antihypertensive medications studied in randomized controlled trials of good and fair quality

Major Outcomes Considered

- Overall mortality
- Cardiovascular disease (CVD)-related mortality
- Chronic kidney disease (CKD)-related mortality
- Myocardial infarction, heart failure, hospitalization for heart failure, stroke
- Coronary revascularization (includes coronary artery bypass surgery, coronary angioplasty and coronary stent placement), other revascularization (includes carotid, renal, and lower extremity revascularization)
- End-stage renal disease (ESRD) (i.e., kidney failure resulting in dialysis or transplantation), doubling of creatinine level, halving of glomerular filtration rate (GFR)

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Initial search dates for the literature review were January 1, 1966, through December 31, 2009. The search strategy and PRISMA diagram for each question is in the online Supplement (see the "Availability of Companion Documents" field). To ensure that no major relevant studies published after December 31, 2009, were excluded from consideration, 2 independent searches of PubMed and CINAHL between December 2009 and August 2013 were conducted with the same MeSH terms as the original search. Three panel members reviewed the results. The panel limited the inclusion criteria of this second search to the following. (1) The study was a major study in hypertension (e.g., ACCORD-BP, SPS3; however, SPS3 did not meet strict inclusion criteria because it included non-hypertensive participants. SPS3 would not have changed our conclusions/recommendations because the only significant finding supporting a lower goal for BP occurred in an infrequent secondary outcome). (2) The study had at least 2000 participants. (3) The study was multi centered. (4) The study met all the other inclusion/exclusion criteria. The relatively high threshold of 2000 participants was used because of the markedly lower event rates observed in recent randomized controlled trials (RCTs) such as ACCORD, suggesting that larger study populations are needed to obtain interpretable results. Additionally, all panel members were asked to identify newly published studies for consideration if they met the above criteria. No additional clinical trials met the previously described inclusion criteria. Studies selected were rated for quality using National Heart, Lung, and Blood Institute (NHLBI) standardized quality rating tool and were only included if rated as good or fair.

Detailed search strategy for each question is provided in the appendix of the Supplement document (see the "Availability of Companion Documents" field).

Number of Source Documents

For Question 1, 1498 articles were screened. Of these, 1457 articles were excluded because they did not meet the prespecified inclusion criteria. Of the 41 included articles, 7 were rated as good, 18 rated as fair, and 16 rated as poor, thus resulting in 25 articles abstracted.

For Question 2, 1980 articles were screened. Of these, 1915 articles were excluded because they did not meet the prespecified inclusion criteria. Of the 65 included articles, 14 were rated as good, 23 rated as fair, and 28 rated as poor, thus resulting in 37 articles abstracted.

For Question 3, 2668 articles were screened. Of these, 2570 articles were excluded because they did not meet the prespecified inclusion criteria. Of the 98 included articles, 17 were rated as good, 47 rated as fair, and 34 rated as poor, thus resulting in 64 articles abstracted.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Evidence Quality Rating

Type of Evidence	Quality Rating*
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RCTs with minor limitations affecting confidence in, or applicability of, the results Well-designed, well-executed non-randomized controlled studies and well-designed, well-executed observational studies Well-conducted meta-analyses of such studies Moderately certain about the estimate of effect; further research may have an impact on confidence in the estimate of effect and may change the estimate	Moderate
RCTs with major limitations Non-randomized controlled studies and observational studies with major limitations affecting confidence in, or applicability of, the results Uncontrolled clinical observations without an appropriate comparison group (e.g., case series, case reports) Physiological studies in humans Meta-analyses of such studies Low certainty about the estimate of effect; further research is likely to have an impact on our confidence in the estimate of effect and is likely to change the estimate.	Low

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Methods Used to Analyze the Evidence

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

An external methodology team performed the literature review, summarized data from selected papers into evidence tables, and provided a

summary of the evidence. From this evidence review (see the "Availability of Companion Documents" field), the panel crafted evidence statements and voted on agreement or disagreement with each statement. For approved evidence statements, the panel then voted on the quality of the evidence (see the "Rating Scheme for the Strength of the Evidence" field).

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Panel members appointed to the Eighth Joint National Committee 8 (JNC 8) were selected from over 400 nominees. Panel members were selected based on their expertise in hypertension, primary care, including geriatrics, cardiology, nephrology, nursing, pharmacology, clinical trials, evidence-based medicine, epidemiology, informatics and the development and implementation of clinical guidelines in systems of care.

The panel also included a senior scientist from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), a senior medical officer from the National Heart, Lung, and Blood Institute (NHLBI), and a senior scientist from NHLBI, who withdrew from authorship prior to publication. In assembling the panel, the JNC sought to achieve a balance of expertise and perspectives. The panel met for the first time in September 2008.

Once all evidence statements for each critical question were identified, the panel reviewed the evidence statements to craft the clinical recommendations, voting on each recommendation and on the strength of the recommendation (see Table 3 in the evidence review [see the "Availability of Companion Documents" field]). For both evidence statements and recommendations, a record of the vote count (for, against, or refusal) was made without attribution. The panel attempted to achieve 100% consensus whenever possible, but a two-thirds majority was considered acceptable, with the exception of recommendations based on expert opinion, which required a 75% majority agreement to approve.

Rating Scheme for the Strength of the Recommendations

Strength of Recommendations

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Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

In January 2013, the guideline was submitted for external peer review by the National Heart, Lung and Blood Institute (NHLBI) to 20 reviewers, all of whom had expertise in hypertension, and to 16 federal agencies. Reviewers also had expertise in cardiology, nephrology, primary care, pharmacology, research (including clinical trials), biostatistics, and other important related fields. Sixteen individual reviewers and 5 federal agencies responded. Reviewers' comments were collected, collated, and anonymized. Comments were reviewed and discussed by the panel from March through June 2013 and incorporated into a revised document. (Reviewers' comments and suggestions, and responses and disposition by the panel are available on request from the authors.)

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Reducing major adverse health outcomes from elevated blood pressure (BP)

Potential Harms

- Treatment-associated adverse effects
- Angiotensin-converting enzyme inhibitors (ACEIs) and angiotensin receptor blockers (ARBs) should not be used in combination.

Qualifying Statements

Qualifying Statements

- This evidence-based guideline for the management of high blood pressure (BP) in adults is not a comprehensive guideline and is limited in scope because of the focused evidence review to address the 3 specific questions (see Table 1 in the original guideline document). Clinicians often provide care for patients with numerous comorbidities or other important issues related to hypertension, but the decision was made to focus on 3 questions considered to be relevant to most physicians and patients. Treatment adherence and medication costs were thought to be beyond the scope of this review, but the panel acknowledges the importance of both issues.
- The recommendations from this evidence-based guideline from panel members appointed to the Eighth Joint National Committee (JNC 8) offer clinicians an analysis of what is known and not known about BP treatment thresholds, goals, and drug treatment strategies to achieve those goals based on evidence from randomized controlled trials (RCTs). However, these recommendations are not a substitute for clinical

judgment, and decisions about care must carefully consider and incorporate the clinical characteristics and circumstances of each individual patient.

- The views expressed do not represent those of the National Heart, Lung and Blood Institute (NHLBI), the National Institute of Diabetes and Digestive and Kidney Diseases, the National Institutes of Health, or the federal government.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Clinical Algorithm

Staff Training/Competency Material

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Living with Illness

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

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Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

1997 (revised 2014 Feb 5)

Guideline Developer(s)

Eighth Joint National Committee - Independent Expert Panel

Source(s) of Funding

The evidence review for this project was funded by the National Heart, Lung, and Blood Institute (NHLBI).

Guideline Committee

Eighth Joint National Committee (JNC 8)

Composition of Group That Authored the Guideline

Panel Members: Paul A. James, MD; Suzanne Oparil, MD; Barry L. Carter, PharmD; William C. Cushman, MD; Cheryl Dennison-Himmelfarb, RN, ANP, PhD; Joel Handler, MD; Daniel T. Lackland, DrPH; Michael L. LeFevre, MD, MSPH; Thomas D. MacKenzie, MD, MSPH; Olugbenga Ogedegbe, MD, MPH, MS; Sidney C. Smith Jr, MD; Laura P. Svetkey, MD, MHS; Sandra J. Taler, MD; Raymond R. Townsend, MD; Jackson T. Wright Jr, MD, PhD; Andrew S. Narva, MD; Eduardo Ortiz, MD, MPH

Financial Disclosures/Conflicts of Interest

Panel members disclosed any potential conflicts of interest including studies evaluated in this report and relationships with industry. Those with conflicts were allowed to participate in discussions as long as they declared their relationships, but they recused themselves from voting on evidence statements and recommendations relevant to their relationships or conflicts. Four panel members (24%) had relationships with industry or potential conflicts to disclose at the outset of the process.

Conflict of Interest Disclosures

All authors have completed and submitted the International Committee of Medical Journal Editors (ICMJE) Form for Disclosure of Potential Conflicts of Interest. Dr Oparil reports individual and institutional payment related to board membership from Bayer, Daiichi Sankyo, Novartis, Medtronic, and Takeda; individual consulting fees from Backbeat, Bayer, Boehringer-Ingelheim, Bristol Myers-Squibb, Daiichi Sankyo, Eli Lilly, Medtronic, Merck, Pfizer, and Takeda; receipt of institutional grant funding from AstraZeneca, Daiichi Sankyo, Eisai Inc, Gilead, Medtronic, Merck, Novartis, Takeda Global Research and Development Inc; individual payment for lectures from Daiichi Sankyo, Merck, Novartis, and Pfizer; individual and institutional payment for development of educational presentations from ASH/AHSR (Daiichi Sankyo); and individual and institutional payment from Amarin Pharma Inc, Daiichi Sankyo, and LipoScience Inc for educational grant(s) for the Annual UAB Vascular Biology & Hypertension Symposium. Dr Cushman reports receipt of institutional grant support from Merck, Lilly, and Novartis; and consulting fees from Novartis, Sciele Pharmaceuticals, Takeda, sanofi-aventis, Gilead, Calpis, Pharmacoepia, Theravance, Daiichi-Sankyo, Noven, AstraZeneca Spain, Merck, Omron, and Janssen. Dr Townsend reports board membership with Medtronic, consultancy for Janssen, GlaxoSmithKline, and Merck, and royalties/educational-related payments from Merck, UpToDate, and Medscape. Dr Wright reports receipt of consulting fees from Medtronic, CVRx, Takeda, Daiichi-Sankyo, Pfizer, Novartis, and Take Care Health. The other authors report no disclosures.

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This is the current release of the guideline.

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Guideline Availability

Electronic copies: Available from the [Journal of the American Medical Association Web site](#) .

Availability of Companion Documents

The following is available:

- Supplement to 2014 evidence-based guideline for the management of high blood pressure in adults: report by the panel appointed to the Eighth Joint National Committee (JNC 8). Supplementary online content. Bethesda (MD): U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Heart, Lung and Blood Institute; 2013. 291 p. Electronic copies: Available from the [Journal of the American Medical Association \(JAMA\) Web site](#) .

A continuing medical education (CME) activity is available to registered users from the [JAMA Web site](#) .

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI on January 5, 1999. The information was verified by the guideline developer on April 30, 1999. The summary was updated by ECRI on June 11, 2003 and July 2, 2014. The updated information was verified by the guideline developer on July 7, 2014.

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